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Stephen H. Harnish* (harnishs@bluffton.edu). *Cluster computing to visualize sound and engineer effective metrics of space and time.*

Using a LittleFe mini-cluster (6 dual-core processors) we visualize molecular dynamics simulations of acoustic waves in Lennard-Jones solids. The employed molecular dynamics code is LAMMPS and visualization tools are AtomEye and VMD. We then analyze the dependence of longitudinal sound wave velocity and frequency peaks on pressure, temperature and wave amplitude. These visualizations and mathematical analyses demonstrate new methods for generating effective spatial and temporal metrics. These metrics are of particular interest to theoretical physicists researching sonic, solid-state analogues of gravity and black holes. This work is a continuation of research funded by the National Science Foundation's Office of CyberInfrastructure through the Blue Waters Undergraduate Petascale Education Program. (Received September 17, 2013)